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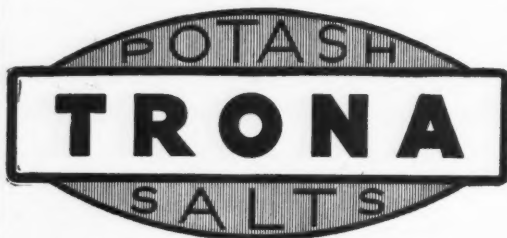
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See page 29



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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

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FEBRUARY 24, 1945

No. 4

Fertilized Corn Plants Require Well-Ventilated Soils*

By G. N. HOFFER, *Lafayette, Indiana*

UNLIKE rice, cranberries, weeping willows, cypress, and other water-loving plants in general, corn plants grow best in well-drained and aerated soils. They cannot endure wet soils for any length of time and cannot get along without plenty of oxygen for their hard-working root systems. Few of us realize the amount of work which the roots of corn plants carry on. They must anchor the plants firmly and must absorb mineral nutrients in abundant amounts to support the demands of the above-ground, sun-lighted parts of the plants. They are the living parts of the corn plant which we frequently overlook when we try to diagnose foliage-deficiency symptoms or become dissatisfied with the size and quality of the ears produced.

The root cells contain living protoplasm which must be nourished with foods delivered to them from the green parts of the plants. The root cells breathe and need ample supplies of oxygen for their respiration. They give off carbon dioxide as a by-product which if it accumulates and dilutes the oxygen supply in the air spaces around the roots becomes harmful. Hence it is important to have the root zones well ventilated, i. e., ample oxygen for the breathing roots and the continued oxidation of plant nutrients, and to provide escape avenues for accumulated carbon dioxide and other gases generated in soils when organic matter decomposes.

Many fields of corn in the Midwestern States during the past season were fertilized by placing large amounts of fertilizers into the plow furrows when the fields were plowed.

*Reprint from "Better Crops with Plant Food."

Frequently large amounts of organic debris of former crops were also turned under. The fertilizers used were mostly those containing high percentages of nitrogen, such as 8-8-8 and 10-6-4, and were applied at rates from 800 to 1,200 pounds per acre. In addition, the plants were fertilized in the row with starter fertilizers of various grades and rates.

Excellent results were obtained in practically all cases where the soils were found to be well-drained and in good tilth, and where the stands of corn and the rainfall were ample. Increased yields of from 15 to 85 bushels of corn were harvested. When the applied fertilizers produce these profitable increased yields, much satisfaction to the growers results.

Negative Results Studied

However, during the latter part of the 1944 growing season numerous cases of "negative" responses to the plow-furrow fertilizers were reported. The heavily fertilized plants were no better than the plants fertilized in the regular manner with row applications. Some of the growers were ready to condemn this plow-under method of using fertilizers because it did not work in their fields. It became quite important to discover whether the method was at fault or whether the grower was at fault in using the method in fields unsuited for it.

It has been the opportunity of the writer to study a number of these so-called "negative-response" fields in several States. In all cases the situations found were very much the same. By going underground and noting the roots of the non-responsive plants and by

splitting open lengthwise the affected corn plants, the story of root suffocation and poisoning of the joint tissues unfolded. The disintegrated joint tissues in the base of the plants showed why many of the dependent roots were starved in addition.

Briefly, the diagnosis of these troubles seemed to be as follows: when large quantities of organic matter and nitrogen-carrying fertilizers are plowed into the soil, enormous amounts of nutrient and energy materials are available for the corn plant roots and the soil organisms, mostly bacteria and fungi, to feed upon. These stimulated activities create

a large demand for oxygen for both the growing corn roots and these other soil inhabitants. In well-drained soils in good tilth and aeration capacity, the oxygen of the air and that carried into the soil in rain is adequate for all the living entities involved as in Figure 6. When the supply of oxygen in the soil air and water becomes insufficient for the living corn roots and microorganisms, an oxygen tension is created under which the corn roots cannot compete with the soil bacteria and fungi, Figure 5. The corn roots need free oxygen while the bacteria in manifold reduction processes can extract it from

CHEMICAL TESTS FOR FERRIC AND FERROUS IRON IN SOILS



Fig. 1. Place soil samples on crease at (a) and (b). Add two drops acid-A to soils and fold paper tightly.

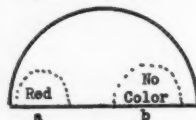


Fig. 3. Red color (a) indicates Ferric iron.
GOOD AERATION.

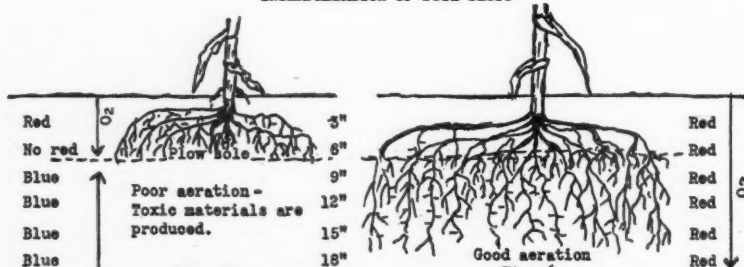


Fig. 2. To wet areas apply one drop Sol. B to (a), and one drop Sol. C to (b).



Fig. 4. Faint red or no color at (a) and blue color at (b) indicates Ferrous iron
POOR AERATION

INTERPRETATION OF SOIL TESTS



Note: The soil conditions indicated by these tests are not stable. Both ferric and ferrous iron may be found in some tests depending on whether the soil oxygen deficiency is improving or getting worse. Weather conditions, drainage facilities and other factors will aid in the diagnosis.

numerous oxygen compounds in the soil as well as those in the applied fertilizers.

Such conditions occur mostly in heavy-textured soils, either because of poor drainage facilities or because the tilth or porosity of the soils has deteriorated due to a depletion of the original organic matter. In some of the fields the penetration of oxygen is adequate only three to four inches below the surface, or maybe to the plow sole, and the roots of the corn plants remain healthy to these depths. When the oxygen deficiency occurs in this six- to eight-inch zone, the consequences are serious to the corn roots, as shown in Figure 5. The roots closer to the surface may survive but the deeper ones succumb to suffocation and/or poisoning from the reduced compounds produced by the bacteria, technically known as anaerobes, when competing for oxygen under these conditions. Some varieties of corn plants respond to these conditions of oxygen deficiency by producing "brace-roots" from joints above the surface of the soil. These roots are stimulated into growth not so much by the swaying of the corn plants as by defections of the lowermost joint tissues in the bases of the stalks. The brace-roots grow into the upper layers of the soil and function in these aerated parts.

Diagnosis Relatively Simple

The diagnosis of these aeration-deficiency troubles is relatively simple. In most Mid-western soils there are large quantities of iron compounds which are very responsive to the conditions created by oxygen tensions in the soil. When the demand for oxygen for the rapid decomposition of organic matter takes place under the usual warm soil conditions in summertime and the supply of oxygen in the soil air and moisture is insufficient, the ferric-iron compounds will give up some of their oxygen to the organisms and ferrous-iron compounds are formed. The relative extent of the reduction of ferric iron to ferrous iron at different levels in the soil profile must be detected within a few seconds in the field when the soils under these conditions are studied. By means of simple chemical tests described later, the depth of oxygen penetration into the soils can be noted by determining how deep ferric iron is present in the soil.

Corn roots thrive in the soil layers when the tests show most of the iron in the ferric condition. When the tests for ferric iron become less and the amounts of ferrous iron increase, the roots are damaged either by suffocation or by deleterious materials such as nitrites, sulphites, sulphides, and uno-

idized organic acids generated under these conditions of oxygen deficiency. Some of the non-responsive corn plants in fields with plowed-under organic matter and fertilizers had living functioning roots only in the upper three to four inches. The tests for ferric iron were positive only in these upper parts of the soil profile.

In responsive corn fields the soil tests showed ferric iron in abundance to 20- and 30-inch depths. Accordingly, it was apparent in a most striking way that corn roots are very sensitive to the oxygen deficiencies, as indicated by these ferric and ferrous iron tests. When conditions in the soil, such as occur with temporary water-logging, poor porosity, compaction from plowing the soil too wet, and slow drainage, favor even temporary anaerobic decomposition of the organic matter to the extent that ferric iron and other compounds lose their oxygen, corn roots in these oxygen-deficient zones are damaged severely and cannot function normally in absorbing nutrient materials.

These aeration diagnoses can be made at any time during the growing season. By making quick soil tests for ferric and ferrous iron in the field from freshly exposed soil and observing the state of health of the corn roots under these various conditions during the growing season, it becomes very obvious why corn roots can utilize fertilizer materials only when they are supplied with oxygen, either from the soil air or rain water, at a level sufficiently high to keep most of the iron compounds in a ferric state. They must remain absolutely healthy when in competition with all of the other soil inhabitants for plant nutrients. When the competitive conditions favor the corn plants, they can then absorb the plant nutrients in sufficient amounts to produce high yields of good quality corn. It is true also that under these soil conditions of good aeration the fertilizing materials remain in the best form for absorption by the roots.

It is hoped that these observational and simple chemical test diagnoses will direct the attention of research students in soil fertility to these aeration problems connected with the deep placement of fertilizers for corn and other crops. If any conclusions can be drawn from the above report, they would be that to grow corn successfully in seasons with adequate rainfall the soil must be in good physical condition to supply oxygen adequately to the functioning root system in competition with all of the other environing factors. If

(Continued on page 28)

Advance in Tennessee Phosphate Rock Price

A price increase of 10 cents a ton, at the miners' level, for Tennessee phosphate rock, essential in making fertilizer and chemicals required for the production of food and munitions, was announced on February 13th by the Office of Price Administration.

This action, effective February 17, 1945, will make no change in retail prices. Manufacturers of fertilizers and chemicals, purchasing Tennessee phosphate rock, will absorb the miners' price increase. Furthermore, distributors who buy the finely ground phosphate rock from the mining companies will absorb the price increase and continue selling it to farmers at present prices, OPA said.

This price increase is the estimated cost of an increase in wages recently granted four companies engaged in mining and processing Tennessee phosphate rock, by the Fourth Regional War Labor Board with the approval of the Director of Economic Stabilization. These four companies sell virtually all of the Tennessee phosphate rock.

Changes in Smith Agricultural Chemical Co. Executives

John E. Powell, president, The Smith Agricultural Chemical Co., Columbus, Ohio, has reported the following changes in their organization: Nelson T. White, 1st vice-president, has been transferred from Saginaw to Columbus and will act as general sales manager; Howard F. Kimble, vice-president and branch manager of the Indianapolis plant; Dick Miles, vice-president and branch manager of the Holland, Mich., plant; Hartl W. Lucks, assistant sales manager and advertising manager at Columbus; Carl E. Veth, secretary, also will purchase materials and supplies; Frank H. Nicklaus is assistant secretary; Clement S. Schmelzer continues as treasurer; Joseph W. Sheeran becomes assistant treasurer and auditor. Lawrence Powell is in charge of plant operations at Saginaw, Mich., and Earl F. Cline of the Carey, Ohio, humus plant.

Coloring Fluoride Proposed

Fertilizer manufacturers engaged in defluoriding rock phosphate are concerned over bill H. R. 1764 which requires the coloring of fluoride and other insecticide or fungicide materials so that they will not be mistaken

for food powders, unless the Secretary of Agriculture should in any instance deem it unnecessary for the protection of public health. Regulation as to colors and carrying out the purpose of the act is assigned the Secretary of Agriculture.

New Superphosphate Plant for International

International Minerals and Chemical Corporation is adding a \$125,000 acidulating plant to its Chicago Heights, Ill., fertilizer factory for the manufacture of superphosphate, according to Louis Ware, president.

The addition, which will come into production about March 15th, is expected to increase the capacity of the Chicago Heights plant 25 to 30 per cent over present tonnage and will allow the corporation to expand its fertilizer business in Illinois, Indiana, Michigan, Wisconsin and Iowa, the States served by the plant.

Mr. Ware also announced that the corporation plans to build two additional fertilizer plants in the Midwest to serve this territory when materials are available.

The present addition to the Chicago Heights plant is the second since the plant was built in 1938.

Jones & Laughlin Organizes Sulphate of Ammonia Sales

Jones & Laughlin Steel Corporation of Pittsburgh has announced that the sale of two of its products, sulphate of ammonia and ammonia liquor, has been transferred to By-Product Sales Department, headed for the last four years by B. E. Stewart, Manager of Sales.

Savitz and Taylor Transferred to International New York Office

The International Minerals and Chemical Corp. has announced the appointment of George V. Savitz as New York District Sales Manager of the Potash Division, and Henry L. Taylor, Jr., as Assistant District Sales Manager of the same division. They will have their offices at 61 Broadway, New York. Mr. Savitz was formerly with the company's fertilizer division at Raleigh, N. C., and Mr. Taylor was in the home office at Chicago.

Industry Advisory Committee Discusses Fertilizer Production Problems

G. F. MacLeod, New WFA Fertilizer Head, Presides at February Meeting. Improvement in Material Supply Situation Hoped For. Labor Problems Discussed.

THE WFA Fertilizer Industry Advisory Committee met in Washington on Feb. 15th, G. F. MacLeod, WFA, presiding. Also present: H. M. Albright, H. B. Baylor (for Franklin Farley), A. H. Carpenter (for John E. Sanford), George Cushman, Ralph B. Douglass, George W. Gage, S. B. Haskell, M. H. Lockwood, John A. Miller, John L. Morris (for Wm. B. Tilghman, Jr.), M. H. McCord (for C. F. Hockley), O. J. Noer, Walter S. Rupp, C. D. Shallenberger, Nelson T. White, F. J. Woods, J. A. Woods, members of the Committee; Charles J. Brand, Russell Coleman, R. W. Cummings, A. F. Miller, D. S. Murph, John W. Turrentine, by invitation; G. R. Carson, T. L. Jefferies, C. L. Long, L. G. Porter, G. M. Worman, Fertilizers Division, WFA, U. S. D. A.; D. W. Aitken, W. E. Atterbury, A. E. Burns, M. L. DuMars, W. G. Finn, O. S. Fisher, R. J. Haskell, A. L. Mehring, W. A. Minor, E. C. McVoy, F. B. Northrup, F. W. Parker, W. F. Watkins, other U. S. D. A.; Dale C. Kieffer, William Lehmann, H. L. Taylor, Alonzo White, WPB; C. G. Gran, W. T. Hart, OPA.

Director F. B. Northrup, Office of Materials and Facilities, stated that in November there was too great optimism regarding the end of the war, and at that time he expressed views of WFA looking forward to the elimination of Government controls over fertilizer. We must now contemplate continuance of the war for an uncertain period. WFA has now no crystallized plans for the fertilizer industry. He solicited continued advice of the Committee as to the appropriate time to amend or revoke controls. He presented:

Dr. G. F. MacLeod, the new chief of the Chemicals and Fertilizers Branch. Dr. MacLeod, presiding over the deliberations of the Committee for the first time, expressed appreciation of the past services of the Committee and bespoke its continued cooperation.

Superphosphate

The superphosphate subcommittee and WPB representatives reported on the superphosphate situation. Conditions with respect to sulphuric acid have not been quite as serious as they appeared in November, the improve-

ment being evident both as to supplies and as to tank cars for moving the acid. This has resulted in some improvement in the superphosphate situation. Production figures for 1944-45 (actual for the first two quarters and estimated for the last two quarters, all figures basis 18 per cent) were given as: Normal superphosphate 6,669,654 tons; triple superphosphate 662,500 tons; total 7,332,154 tons. Total actual production for 1943-44 was 7,542,106 tons (basis 18 per cent).

The present estimated drop in production for 1944-45 is approximately 210,000 tons as compared with the estimated drop of approximately 1,150,000 tons based on conditions existing in November. Deduction of 517,000 tons (exports, TVA non-commercial production, and defluorinated superphosphate) from the total estimated production for 1944-45 leaves 6,814,654 tons available for fertilizers. Requirements for mixed goods are estimated at 4,666,000 tons and for direct commercial application at 1,000,000 tons. Deduction of 5,666,000 tons from the total available for fertilizers leaves a balance of 1,148,654 tons for other uses. About 325,000 tons were shipped to AAA through December, and contracts with AAA cover about 420,000 tons additional. It was pointed out that there is no certainty regarding the total actual production in 1944-45 and that the production figure given assumes that sufficient labor and transportation facilities will be available.

Potash

WPB reported that the allocation of potash will shortly be transferred to General Allocation Order M-300 with a schedule (as has been done with respect to nitrogen), but without any accompanying change in allocation procedure.

At present sulphate of potash is the principal problem. Conversion of muriate of potash to sulphate was begun, as planned, at the neoprene plant of the Rubber Reserve Company at Louisville, but was stopped in a short time by a breakdown of one of the furnaces. After a study of the whole situation, including an on-the-spot investigation at the plant, WPB reached the conclusion that

resumption of the conversion was not feasible. There is some possibility of installing a new furnace, to be used in the potash conversion, but decision as to this has not been reached. Because of its location and freight rates, Louisville is not entirely suitable as a location point for such conversion.

WPB estimated that if existing plants continue production at the present rate and if the new plant comes into operation, next year's production should exceed this year's production by 100,000 tons of 60 per cent muriate. It was stated that such matters as labor scarcity, strikes, and delay in obtaining essential materials have delayed the construction of the new plant, but it is now expected that it will be completed about April 1st.

It was reported that use of potash by the chemical industries for other than fertilizer purposes has increased from about 30,000 tons of materials in 1938-39 to about 150,000 tons (allocated) in 1944-45. It seemed to be the consensus of the Committee that more potash, including more sulphate, will be needed for fertilizers next year.

Chemical Nitrogen

Allocations under General Allocation Order M-300 and the appropriate schedules, WPB pointed out, are much the same as they were under the replaced Orders M-62, M-163, M-164, and M-165. The principal difference is that under the present procedure the buyer must certify the end to his supplier and must use the materials for the purposes certified.

Deliveries of chemical nitrogen to date and prospects for the rest of the year are somewhat more encouraging than they were last fall. Present indications are that 600,000 tons of nitrogen for fertilizer use will be shipped during 1944-45. This amount, with the excess (estimated at 22,000 tons) of the June 30, 1944, inventory over the preceding June 30th inventory, should mean about 622,000 tons of nitrogen available for farms during the year, as compared with 631,000 tons consumed last year. However, there will be less solutions and ammonium nitrate and more nitrate of soda.

Due to increased production and delays in the military take, the supply of solutions available for fertilizers increased above the 60,000 tons anticipated at the beginning of the year. We should have about the same amount for March as we had for December and January, but it may be that no solutions will be available for agriculture after March.

Domestic supply of ammonium nitrate during the first half of 1944-45 was better than

had been anticipated, but if present military schedules are followed there will be little, if any, of the TVA product for fertilizer after February. It is probable that on the West Coast about 500 tons per month of ammonium nitrate will be available from domestic production for the rest of the year, in addition to the ammonium nitrate expected from Canada. In the East, Canadian production will probably be the only source of supply. As the Canadian production must be divided among various claimant countries, our share will probably suffer, with the result of meager allotments to individual buyers.

Tonnages of ammonium sulphate already assigned will require about all that can be produced. Labor difficulties or bad weather might even affect production to such extent that the assigned tonnages could not be delivered in full. No further commitments can be made for this year . . . There were read to the Committee a letter (December 14th) from War Food Administrator Jones to the War Shipping Administration setting forth the need for ships to bring in Chilean nitrate of soda pursuant to the nitrogen program, and the WSA reply (February 5th) advising that that agency appreciated the importance of the program and was doing everything possible, in view of war conditions, to maintain it. During discussion of the situation it was indicated that the whole 850,000 tons of Chilean nitrate contemplated in the program were expected to arrive in time for crop use this year. Some of this nitrate is being landed on the West Coast and trans-shipped to the East.

Report of Fertilizer Subcommittee

The subcommittee, with respect to certain subjects submitted for its consideration, (1) recommended continuation of the present War Food Order 5, Amendment 1, through June 30, 1945; (2) expressed the opinion that recent change in the WPB nitrogen orders had not materially affected the flow of supplies, pointing out that there are some inconveniences due to restrictions on the uses of ammonium sulphate and nitrate of soda but making no recommendation as to change; (3) expressed the opinion that total quantities of fertilizers equal to the volume used in 1943-44 would be consumed in 1944-45, with a possible slight increase if available supplies permit, this being the overall picture and subject to variations in different areas; (4) recommended to the Committee "That the War Food Administration urge that the importa-

(Continued on page 26)

IT MAY BE

By SAMUEL L. VEITCH

Box Car Shortage

Feed processors of the Corn Belt are becoming jittery over the shortage of freight cars and their inability to fill eastern orders for dairy and poultry feed. Railroad cars, they say, are being piled up on Eastern Seaboard and are not being returned to the Midwest. Reports from eastern feeders indicate they are equally worried. Shippers are holding emergency meetings with Office of Defense Transportation in an effort to find a way of moving feed from the Midwest to the East.

Taxation Talks Watched

Farm and business groups in this section of the country are watching with keen interest the discussions between farm group economists and a joint committee from the Internal Revenue and Treasury Department on business taxation. There appears to be general approval of any move which would enable business to maintain full employment and thus keep consumer purchasing power high. It is felt that any form of taxation which hurts either agriculture, business or labor would clog channels of distribution and thereby injure all three.

Crop Control

New crop control legislation, in preparation for post-war readjustment of agriculture, is probable at this session of Congress. Most farm leaders favor control, but differ as to form.

WFA announced, with much misgivings, the long awaited dry peas "guinea pig" plan for post-war crop control.

Farm Machinery

WFA asked WPB for an allocation of 260,000 tons of steel for farm machinery in the second quarter of this year, to meet minimum needs, and got only 175,000 tons. Dealers have booked orders considerably in excess of the supply. WFA thinks it may be forced to ration to take dealers off the hot-spot. It would have to be accompanied by distribution control and that would take two or three months to get into operation. Veterans would get preference in the purchase of farm machinery. Plans now being worked out by WFA provide for issuance of "priority certificates," entitling veterans to machines ahead

of other farmers operating comparable acreage. Senator Wherry (Neb.) introduced a bill to "provide for establishment of a pool for farm machinery for release to veterans who desire to engage in farming operations."

Surplus Land

You can lease, but not buy, war surplus land. The Surplus War Property Board has authorized the Army and Navy to lease land declared surplus, pending development of sales plans. Although more than 100,000 acres, out of 7,000,000 acres total holdings, have been abandoned by the Army and declared surplus, not an acre has been sold. The Board expects to designate shortly the Government Agency to handle sales. Probably the Farm Security Administration will get the job. Sales cannot start until a detailed program is worked out and that will take another two to three months.

Social Security to Farmers

Plans to extend social security to farmers are in the Agriculture Department and Social Security Board workshops. As plans now stand, farmers would use income tax forms for reporting income for social security, making payments along with income taxes. Under the proposed plan each self-employed farmer would pay 7 per cent of his net income to cover old-age and survivors insurance benefits, plus proposed disability insurance, medical and hospital cost insurance.

Corn

New OPA corn price ceiling regulation boosts maximum prices by one-half cent a bushel; to \$1.16½, Chicago basis, for No. 2 yellow and No. 2 mixed. All white corn continues 15 cents over yellow.

Revision of Area A boundaries boosts prices in Corn Belt "fringe" areas of Illinois, Ohio and Indiana by from 2 to 9 cents per bushel. Additional 1¼ cents merchandising markup is provided on corn shipped on Great Lakes and by barge south and east from Cairo, Illinois.

Sugar

New home canning sugar regulation allows up to 20 pounds per person on application to Ration Board. Sugar stamps will not be validated as last year.

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Demand for Fertilizers Increases

Fertilizer tag tax sales in seventeen States making monthly reports, reveal that in January, 1945, sales were made for 1,343,025 tons compared with 1,243,750 tons in 1944. July to January sales, 1944-1945, were for 3,679,270 tons compared to 3,526,100 tons for a similar period of 1943-1944.

The sale of fertilizer tax tags, of course, does not represent the tonnage actually sold and shipped, but is an index of anticipated sales based on orders received by fertilizer manufacturers. It reflects an increased demand of consumers and dispels any doubt that may have existed that the demand for fertilizers would be decreased by reason of the growing labor shortage on the farm. Farmers have apparently wisely concluded to make the most of their labor by increasing the applications of fertilizer to get higher yields per acre.

The ability of the farmer to buy fertilizers was never greater and the opportunity for getting large returns from their use on crops bringing relatively high prices creates a very favorable trade opportunity for fertilizer manufacturers. The demand is increased, but the question of supplying the demand remains to be solved.

The fertilizer industry is finding difficulty in getting all the materials they will need to meet the demand, among the scarcest being organic ammoniates and some of the inorganic nitrogens, and superphosphates made scarce by a large diversion of sulphuric acid into war channels.

Even if all the needed materials were available, the fertilizer industry is short-handed in labor, and is experiencing increased transportation difficulties. Factory output would have been greater had more farmers ordered their fertilizers early for immediate delivery. Accumulated fertilizers in the plants, of course, do not leave enough elbow room for the greatest production efficiency and maximum output.

The golden opportunity is thus beset with difficulties. Unfortunately for the fertilizer manufacturer, unfortunately for farmers who find they cannot get all the fertilizers they need, and unfortunately for the country as a whole, if food crops are not what they might have been, had there been plenty of plant food available.

Lt. Col. Morgan, Connecticut Agronomist, Killed in Action

Lt. Col M. F. Morgan, chief agronomist at the Connecticut Agricultural Experiment Station, was killed in action on Leyte on January 15th. Word of his death was received by his wife, Mrs. Dorothy Junkin Morgan, of Mt. Carmel. He also leaves two sons, Richard, 13, and David, 8.

Dr. Morgan came to New Haven in 1923 to organize a soils department at the Experiment Station. He had been head of the department since that time. In March, 1942, he was called to active service in the Army and was on military leave from the Station. He left for overseas in November, 1944.

"Dr. Morgan's death is an irreparable loss to the Station, to Connecticut and to science. His keen mind and boundless energy had brought him to a position of leadership among soil scientists. Connecticut agriculture will miss him sorely," said William L. Slate, director of the Station.

One of Dr. Morgan's outstanding achievements during his time at the Experiment Station was the development of a method of soil testing, now used throughout the world. He was one of the first to make a soil survey based on land use, as well as soil types. He made and published soil maps of Connecticut, using this method of surveying. He was also known for his studies at the Tobacco Substation at Windsor, concerning the utilization of fertilizer by tobacco and vegetable crops.

During the First World War, Dr. Morgan served as a company commander in France and in the Army of Occupation. He was decorated for bravery in action with the Distinguished Service Cross and the Croix de Guerre. He had been a reserve officer since that time.

Occupational Deferment for Fertilizer Workers

The War Food Administration has been authorized by the Selective Service System to certify requests for occupational deferment of men under 30 employed in most of the food industries of the Nation, who were classified 2-A or 2-B on January 1st of this year. Roger J. O'Donnell, of the food industries Division of the WFA Office of Labor, has been named the certifying officer.

The industries for which WFA is the certifying agency are fruit and vegetable processing, which includes fertilizer manufacture, canning, preserving, freezing, drying, and packing; meat packing and poultry packing and dressing; processing of cotton and other fibers; tobacco; grain products, including bakeries; dairy products and fats and oils processing; sugar processing; and car icing and ice harvesting and manufacture.

Under Selective Service regulations, WFA can certify for deferment 30 per cent of the men under 30 in these industries who were 2-A or 2-B on January 1st. Employers must initiate requests with the WFA district representatives serving on the production urgency and manpower priorities committees. The WFA district representatives have been authorized to certify only a part of the 30 per cent in the field. The rest are to be certified in Washington.

The procedure requires that employers in the designated industries furnish the WFA district representatives with lists of all their workers who meet the qualifications, together with two sets of Selective Service form 42-A Special, Revised, for each man they want deferred. The forms can be obtained from the WFA district representatives or from State Selective Service headquarters. An employer must also certify that he is submitting the information called for on the form to just one agency of the Government.

The certifications are sent to the registrants' local Selective Service Boards, with one copy each to the State Director and National Director of Selective Service. After receiving the certification, the local board decides whether to grant the deferment.

Hay and Pasture Lands' Need of Phosphates

H. E. Hendricks, Extension Agronomist of the University of Tennessee, says in a recent news release that three-fourths of the land planted to hay and pasture crops in Tennessee will respond to applications of phosphate.

February, he states, is the best time to apply phosphate as a top-dressing. Alfalfa, clover and lespedeza hay crops, he states, remove greater quantities of phosphate from the land than many farmers realize. To replace what a three-ton crop of alfalfa will remove in a season would require an application of 200 pounds of 20 per cent superphosphate or 400

pounds of basic slag. Likewise, the three-ton crop of alfalfa will remove the equivalent of 300 pounds of muriate of potash each year, together with a substantial amount of borax and lime.

A two-ton crop of lespedeza, Mr. Hendricks points out, removes an equivalent of 100 pounds of 20 per cent superphosphate or 200 pounds of basic slag per acre annually. When phosphates and other necessary fertilizers are applied there are more white and other clovers and less weeds in the pastures.

State Legislation Affecting Fertilizers

Wisconsin

County Boards in Lime Manufacture.—Assembly Bill 52-A of Wisconsin would authorize county boards to provide for and engage in the manufacture, sale and distribution of agricultural lime to be sold at cost to farmers and would authorize boards to purchase lands for such purposes.

Utah

Utah Would Fix Fertilizer Contents.—Utah House Bill 122 proposes minimum requirements of 16 per cent available superphosphate; potash soluble in distilled water; and nitrogen to exclude the more inert forms. A minimum of 16 per cent content of nitrogen, phosphoric acid potash, is proposed for mixed fertilizer. Annual publication of results of inspections is provided.

Georgia

Georgia Changes Proposed.—The Georgia law governing sampling by fertilizer inspectors would make a sample from 10 per cent of the containers a legal sample, except in lots of less than ten containers when each container is to be sampled.

The Commissioner of Agriculture is em-

powered by Senate Bill 73 to appoint the necessary number of fertilizer inspectors.

North Carolina

North Carolina Proposes 18 Per Cent Minimum.—A bill that would fix as a minimum plant food content of fertilizers and superphosphates at 18 per cent and would remove the present limits on minimum and maximum number of approved grades, is proposed for action of the North Carolina Legislature. Fertilizer industry representatives present at the hearings are reported offering no objections to the bill. An amendment, however, was proposed to permit the retention of the 4-9-3 grade solely for tobacco plant beds.

Fertilizing the Cultivated Persimmon

Bulletin 124 entitled *The Cultivated Persimmon in Florida*, issued by the Agricultural Extension Service of Florida at Gainesville, gives full information concerning varieties and cultural practices including fertilization of cultivated persimmons. About fertilization it says:

"There is as yet no information from fertilizer experiments available but a satisfactory growth has been derived from the use of the ordinary commercial fertilizers analyzing 4 to 6 per cent nitrogen, 8 to 10 per cent phosphoric acid and 3 to 6 per cent potash. As a general rule one pound of fertilizer per year of age of a tree may be applied, *i. e.*, a tree 4 years old would receive 4 pounds. The fertilizer should be spread in a wide band about the tree. The trees are fertilized in the spring, about the time they start to leaf out, but it may be advantageous to split the application, applying the second half about the first of July."

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FERTILIZER MATERIALS MARKET

NEW YORK

Material Situation Continues Tight. Supplies of Nitrogen and Potash Seem Adequate but Shortage in Superphosphate Grows Steadily Worse. Price Increase in Tennessee Phosphate Rock. Sulphate of Potash Scarce.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, FEBRUARY 22, 1945.

Sulphate of Ammonia

Mixers are taking larger quantities of sulphate of ammonia than has been the case during the past months. This is accounted for to some extent by the shortage of nitrogen solutions for fertilizer use. February output of sulphate is expected to be somewhat smaller owing to the decline in steel production. There has been some delay on shipments because of car shortage and transportation difficulties.

Nitrate of Soda

This material is moving to consumers as fast as it can be produced or imported. Farmers are reported to have laid in larger supplies than usual for top-dressing later in the season. There has been no change in prices, which have been extended through March.

Organics

There has been no easing of the situation in the organics market. Feed manufacturers are taking all supplies that are offered, at ceiling prices. The same condition holds for those organics which are for fertilizer use only.

Superphosphate

No improvement in the superphosphate situation has appeared. In fact, the market is steadily getting tighter. Producers have not been able to keep their plants at full production because of an inadequate labor supply, and in addition a shortage of tank cars has cut down on the supply of sulphuric acid available for superphosphate production. Mixers could take much more than will be produced by the end of the present season.

Phosphate Rock

Producers have been able to keep acidulators supplied with all the rock they can use. OPA has granted an increase of 10 cents a ton to miners in the Tennessee field, effective February 17th. This represents the

estimated cost of a wage increase granted some of the principal producers.

Potash

Allocations for the fifth period (April 1st to May 31st) are somewhat lower than for the same period in 1944. Production for the fertilizer year, however, will top that of 1943-44 by over 11 per cent. It is expected that the total output will run close to 900,000 tons K_2O . The only serious shortage is in sulphate of potash for tobacco fertilizers, due to the increase in military requirements for this material.

CHARLESTON

Organics Market Continues Tight with Feed Producers Taking Most of Supply. Sulphate of Ammonia Scarce.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, FEBRUARY 20, 1945.

The recent embargoes in the Northeast have dislocated the movement of some fertilizer materials booked for shipment to the Southeast.

Organics. The market has become even more tight on organics, especially on nitrogenous materials.

Dried Blood. Feeding demand has about taken up all supplies for the time being, with orders on hand unfilled.

Bone Meal. Still no foreign material being offered, and domestic is being bought almost entirely by feed manufacturers, where they can obtain it.

Sulphate of Ammonia. The market on this very tight in spite of the fact that production in 1944 was over fifty thousand tons more than 1943.

"We need 363 million acres of crops—an area larger than France and the British Isles," say WFA officials in speaking of the 1945 production goals.

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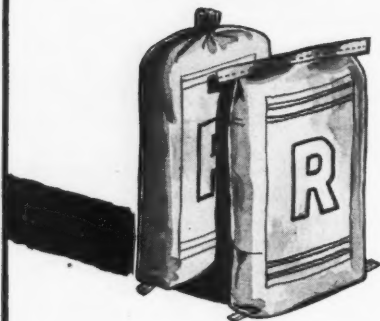


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CHICAGO

Stocks of Organics Distributed by Allotment but Supplies Extremely Short. Feed Market Steady.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, FEBRUARY 20, 1945.

Such limited stocks as organics producers have are being distributed according to allotment, but such allotments are distressingly below actual requirements. Fertilizer tankage is completely off the market, caused largely by labor shortage. There has been a fairly active demand for steamed bone meal, but supplies in seller's hands are about exhausted.

There has been a steady movement of feed materials at ceiling prices.

Ceiling prices are:

High grade ground fertilizer tankage, \$3.85 to \$4.00 (\$4.68 to \$4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, \$5.53 per unit ammonia (\$6.72 per unit N); blood, \$5.53 (\$6.72 per unit N); dry rendered tankage, \$1.25 per unit of protein, f. o. b. producing points.

Higher Yields of Better Tobacco

Suggestions for flue-cured tobacco production are carried in Circular E-386, Virginia Agricultural Extension Service, Blacksburg. The goal the circular sets is 1,200 pounds average per acre.

"Virginia tobacco growers deserve much credit for raising the state average yield of flue-cured tobacco from 630 pounds per acre in 1939 to 990 pounds in 1944. This is remarkable progress, but Virginia producers cannot be satisfied with less than 1,000 pounds per acre if they are to compete successfully with producers south of us. They must continue to increase yields and improve the

quality of their tobacco . . . Virginia growers can easily increase their yields of flue-cured tobacco by 100 pounds per acre if they follow practices recommended by the Experiment Station and used by the best growers."

The circular uniquely displays in a pyramid of block discussions of soils, varieties, plant beds, fertilization and spacing, topping and harvesting.

Soils recommended are sandy loams with yellow to light-red subsoil with good surface drainage. Among the most important soils of this character mentioned are Granville, Durham, Norfolk, and deep phases of Cecil sandy loams. Fair tobacco soils are mentioned as the better grades of Wadesboro, Wilkes, White Store and Alamance sandy loams.

Among the best varieties of flue-cured tobacco given are Yellow Special, Harrison's Special, Yellow Mammoth, White Stem Orinoca and Virginia Bright Leaf. Yellow Special is rated outstanding because it yields well, makes a high quality bright lug, and is highly resistant to black root rot and leaf spot.

Directions are given for locating plant beds on a sunny slope, preferably on freshly cleared land, but if the land is used more than one year it is essential that it be sterilized. Beds six feet wide with tight board sides which, when covered with canvas, will keep out insects, and gases used to control disease will be retained. A tablespoon of seed per hundred square yards of bed and an application of one to three pounds of 4-9-3 fertilizer per square yard are recommended.

Fertilization

The circular says: "Fertilization is one of the most important factors in the production of large yields of high quality flue-cured tobacco. On average tobacco soils, 800 to 1,500 pounds of 3-9-6 fertilizer should be used per acre, while on heavier soils where tobacco tends to grow too large and wild, and ripens

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slowly, 1,000 pounds per acre of 2-10-6 will probably give better returns. Over a three-year period, the Chatham Experiment Station has found that $2\frac{1}{2}$ pounds of borax per acre, applied with the fertilizer, has increased the value of the tobacco \$9.50 per acre on limed soils and \$34.58 on unlimed soils."

Spacing of plants recommended is 20 to 24 inches apart with rows about four feet apart, with plants topped so as to leave 16 to 20 leaves to the plant. Instead of harvesting the whole plant by cutting, the circular advises pulling and curing the leaves as they ripen.

On method of applying fertilizer, the circular says: "Contrary to the belief of many farmers, the method of applying the fertilizer is often of as much importance as the analysis and amount of fertilizer used. . . . Where fertilizer was placed in two bands about seven inches apart and plants set between the bands, fewer replants were necessary and the yield and value per acre were more than where fertilizer was applied in the row by the usual farm method."

Personal Mention

Lee Marshall, Director of the Office of Marketing Services, War Food Administration, resigned January 31st to return to his duties with Continental Baking Corporation. C. W. Kitchen has succeeded Mr. Marshall.

P. H. Groggins, well and favorably known to the fertilizer industry, has been appointed Assistant to the Director, Office Materials and Facilities, WFA. His appointment is based on valuable services hitherto rendered in the war effort.

Dr. G. L. MacLeod has been made Chief of the Chemicals Division of Chemicals and Fertilizer Branch, WFA, to succeed P. H.

Groggins. Dr. MacLeod came into the service from the University of California.

Dr. P. V. Cardon was appointed Administrator of Agricultural Research in the U. S. Department of Agriculture on February 3rd, succeeding Dr. E. C. Auchter who has been appointed Director of the Pineapple Research Institute of Hawaii at Honolulu. Dr. Cardon was formerly connected with Montana State College and later Director of the Utah Agricultural Experiment Station.

Dr. Edwin B. Fred, well known agricultural scientist and formerly dean of the College of Agriculture, director of the experiment station and extension service, University of Wisconsin, has been named president of the University to succeed Dr. E. B. Dykstra, now provost of UCLA. Dr. Fred, a native of Virginia and graduate of Virginia Polytechnic Institute, is noted especially for his contributions to bacteriology in connection with agriculture.

John N. Hodson has been named Director of Agriculture of Ohio by Governor Frank J. Lauche. Mr. Hodson is a dairy farmer of Williams County and prominent in agriculture in Ohio.

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Fertilizers and Farm Practices

From Agriculture Extension Services

Top-dressing of small grain, according to the Georgia Agricultural Extension Service, is urgent. "It does not matter if farmers failed to reach acreage goals as long as they produce the desired grain." The report adds, "The proper use of nitrogen top dressing is an efficient way to increase yields of all small grains."

Use of 100 to 200 pounds of nitrate of soda or its equivalent per acre, applied Feb. 1st to 15th in South Georgia and March 1st to 15th in North Georgia, it was stated could be used with profit.

On fertilizing Irish potatoes, the Mississippi Agricultural Extension Service recently made the following statement:

"Liberal applications of complete fertilizer such as a 6-8-8 or 4-8-8 analysis, are recommended for profitable production of Irish potatoes. An application of at least 1,500 pounds to the acre will pay well on most soils in the hill section of the state. This amount of fertilizer will increase substantially the percentage of No. 1 size potatoes, as well as the total yield. In using this rate of fertilizer, plant at least 600 pounds of seed, spacing the seed pieces 12 to 14 inches apart."

High yield records, without despoiling the soils as was done during World War I, are being attained, according to a statement in the Agricultural News Service of the Florida Agricultural Extension Service. "During 1944," the statement says, "the farmers produced 58 per cent more than they did 30 years before, and at the same time they managed to keep their soils in a fairly good state."

Postwar exports of farm products are essential, says the Mississippi Agricultural Extension Service. "The U. S. D. A. Postwar Committee reminds us that it took bitter experience to teach us a lesson on the importance of imports. Many of us now realize how far this country is from being self-sufficient. Reduction of imports developed shortages in sugar, coffee, olive and other vegetable oils, tin, rubber, silk, quinine and chocolate.

"On the other hand, we produce many farm products that have large sales in world

markets . . . cotton, tobacco, dried fruit, pork products, wheat and apples.

"If farmers in the United States could not sell their goods abroad, they would have to retire 25 to 50 million acres of cropland or shift it to other products."

Heavy top-dressing of small grain is emphasized by W. H. Craven, Extension Agronomist of Clemson College, who says: "This year's small grain crop can still be greatly increased by a heavy top-dressing of the right fertilizers. More grain will thereby be produced with the same labor and equipment."

Nitrogen top dressing is a splendid investment, according to the Tennessee Agricultural Extension Service, which says: "If weather conditions are favorable, the increase in small grain yield from nitrogen top-dressing is frequently worth \$5.00 for every \$1.00 invested."

Cotton Yields from Fertilizer

If you desire to increase acreage yield of your cotton, E. A. Miller, agronomist for the Texas A. and M. College Extension Service, recommends using commercial fertilizer. More cotton per acre, he says, reduces the cost per pound of production, which in turn increases profits. Commercial fertilizers are especially suitable for the cotton-growing areas of East Texas and the Gulf Coastal Prairie.

But before planning a fertilizing program, Miller cautions farmers to order the material now and accept delivery at once. The manpower shortage has affected the fertilizer manufacturers, and wartime traffic on railroads is so heavy that hurry-up deliveries cannot be made. On account of these con-

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ditions it seems likely that late orders will be delayed and may not reach buyers in time for use.

The benefit of fertilizer in cotton growing has been well demonstrated, Miller says. Yields at Experiment Stations in East Texas and the Gulf Coast area were increased from sixty to more than one hundred pounds of lint an acre by the use of four hundred pounds of fertilizer per acre.

In applying this plant food for cotton growing on sandy loam soils of East Texas, Miller recommends three to four hundred pounds per acre of 5-10-5, 6-8-4, or 4-12-4, whichever is available. On soils where cotton rusts or wilt are prevalent a fertilizer with more potash, such as 4-8-8 should be used. On the Gulf Coast dark prairie soils which do not need potash, he recommends the available formula called 4-10-0, and a 6-8-4 for the sandy prairie soils of the same region. In the drier sections, such as the West Cross Timbers area and in South Texas about 200 pounds of fertilizer an acre usually are sufficient for cotton.

Mixed fertilizer should be applied before or at time of planting. The best method is to place it two to three inches to the side and two inches below the level of the seed by means of an attachment on the planter. Otherwise, it can be distributed in the middle and the soil rebudded on top of it. But this should be done ten days or two weeks before planting.

Manganese Deficiency in Florida Palms

Press *Bulletin* 576, Florida Agricultural Experiment Station, says a serious growth-retarding physiological disorder of the plummy coconut palm, variously called "curly top," "curly leaf," and "frizzle leaf," is quite prevalent in Florida.

Experiments conducted at Eau Gallie, Titusville and St. Petersburg during 1941 and 1942 clearly indicate that this disorder is a manganese deficiency. Manganese was applied to the soil and as a foliage spray. Both methods of application were equally effective.

It is recommended that soil applications range from $\frac{1}{2}$ to 5 pounds of 80 to 83 per cent manganese sulphate per tree, depending upon the tree size. Soil treatment made in March, April, May and August were equally effective.

The spray was a 1 per cent manganese-lime spray. It is important in spraying the trees to thoroughly wet the buds. The spray mixture was made by dissolving 3 ounces of 80 to 83 per cent manganese sulphate in $2\frac{1}{2}$ gallons of water. One and one half ounces of finely ground hydrated lime and 1 ounce of calcium caseinate, after adding a small amount of water, are stirred together to make a smooth paste. The paste is stirred rapidly into the manganese sulphate solution.

Records Show Best Farm Practices

Accounts kept during 1943 by 96 farmers in 15 counties representing all the important type-of-farming areas in the state have been studied by P. S. Williamson, farm management Specialist at Clemson College, S. C. Here are some of his conclusions:

1. Farms having the greatest number of crop acres made the highest incomes.
2. An increase in the number of work animals per farm was accompanied by an increase in both farm and labor income.
3. Good crop yields are very necessary to obtain high profits and are probably the most important single factor in obtaining low cost of production per unit.
4. A well balanced farm, including livestock enterprises, makes the most money and farmers should strive to be above average in several factors instead of outstanding in any one.
5. High labor efficiency is quite important in obtaining maximum returns, especially when labor costs are high as compared with the price of farm products.
6. Farms using sharecropper labor made, on an average, higher incomes than did those not using sharecroppers.
7. With the larger farms it is very important to have all the labor-saving equipment

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possible in order to accomplish the most work per day.

8. Proper utilization of land is important. Farms having the largest percentage of cropland and open pasture land had the highest farm and labor income.

9. The efficiency of the land can be increased by the use of sufficient amounts of commercial fertilizers.

INDUSTRY ADVISORY COMMITTEE DISCUSSES FERTILIZER PRODUCTION PROBLEMS

(Continued from page 12)

tions of nitrate of soda from Chile be continued beyond the presently planned loadings of 850,000 tons by April 15, 1945, and that these importations continue regularly throughout the year in order to maintain stocks with which to meet consumer demands"; (5) recommended to the Committee that for the purpose of WFO 5, Amendment 1, the 5-7-10 approved grade in the State of Maine be considered a 2-3-4 ratio, when manufactured in multiple strength; and (6) recommended that the War Food Administration canvass the several States relative to changes, if any, that should be made in the list of approved grades in the event a fertilizer order is continued for 1945-46, so as to have the information available prior to May 1, 1945. Committee discussion developed the consensus that in view of transportation conditions and the fact that probably only minor grade changes would be necessary, such a canvass could be made by mail, without the holding of conferences. The subcommittee's report was accepted by the Committee.

Maximum Prices

Mr. Gran reported that the recently issued Amendment 1 to Revised Maximum Price Regulation 240 increased the maximum price of Tennessee brown phosphate rock by 10 cents a ton, at the miners' level, in order to compensate for the estimated cost of a wage increase granted to mining companies by the

War Labor Board. This change, however, is not to affect retail prices.

Amendment 3 to Second Revised Maximum Price Regulation 135 was issued largely in an effort to help clear up confusion in some quarters as to the functions of the War Food Administration and the Office of Price Administration with respect to the sale of different grades of fertilizer. The determination as to what grades may be legally sold is an exclusive function of WFA. OPA's sole responsibility is to establish maximum prices. It has established maximum prices for all grades approved by WFA for general use; it will establish a maximum price for any other grade upon request of a fertilizer manufacturer but by so doing it makes no ruling or representation that such grade may be legally sold or used—grade legality is a matter for WFA.

Heretofore, the establishing of maximum prices in special cases such as fertilizers for airports, multiple grades, and carried-over goods, has been done through an informal letter from the head of the OPA Agricultural Chemicals Section. Hereafter, such letters must be signed by the OPA Administrator. Mr. Gran spoke discouragingly as to any increase in maximum retail prices for fertilizers.

National Fertilizer Policy

Copies of a report prepared by a committee of representatives of the U. S. Department of Agriculture, including the War Food Administration, entitled "A National Policy for Fertilizers and Liming Materials" were distributed to members of the Fertilizer Industry Advisory Committee. The report was prepared for administrative use and its study has been recommended, by the Secretary of Agriculture, to those interested in the adequate and proper use of fertilizers in the postwar period. W. A. Minor, chairman of the National Fertilizer Policy Committee, stated that fertilizers are so important in the economy of agriculture and the welfare of the nation at large that the Federal Government has a responsibility in connection with their production and use. The Committee was instructed, he said, to consider future as well as present conditions. He discussed various

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This book is an authoritative source of information on all problems concerning commercial fertilizers and their use in gaining larger yields of field and horticultural crops. In this new edition, data from recent research concerning the proper use of individual fertilizer materials and the detection of nutritional deficiencies in plants and soils are included. Essential nutrient elements taken from the soil are arranged in convenient groups. A new chapter on the manufacture and use of ammonia solutions, and colored photographs have been added.

JOURNAL COMMENTS

"This book is based on the practical experience of the author and includes information developed recently by agronomists, agricultural engineers and fertilizer manufacturers."—*Wisconsin Agriculturist*.

"The book should be read by everyone interested in new developments in commercial fertilizers."—*Journal American Society of Agronomy*.

CONTENTS

Origin and Development of the Use of Commercial Fertilizers; Source, Production and Use of Sodium Nitrate; Manufacture and Use of Ammonium Sulphate; Manufacture and Use of the Synthetic Nitrogenous Fertilizers; Sources and Use of Organic Nitrogenous Fertilizers; Sources and Use of Mineral Phosphates; Sources and Use of Bone Phosphate and Basic Slag; Manufacture and Use of the Superphosphates; Use of Ammonia Solutions as Sources of Fertilizer Nitrogen; Production, Manufacture and Use of the Potash Fertilizers; Fertilizers Carrying the Secondary Essential Elements—Sulphur, Calcium, and Magnesium; Fertilizers Carrying the Rarer Essential Elements; Fertilizers Carrying Elements Not Accepted as Essential for Plant Growth; Adjusting Soil Reaction and Fertilizer Practice to Crop Requirement; Principles Underlying the Purchase of Fertilizers; Principles Underlying the Use of Fertilizers; Application of Fertilizers, and the Influence of Fertilizers on Germination and Seedling Growth; Bibliography.

131 Illus., 12 in Colors; 480 Pages; \$4.50

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matters covered by the report, including among others supplies of fertilizer materials, quantitative fertilizer needs, objectives of the proposed national fertilizer policy, and the recommendations of the Committee. It was stated that the report will be available for public distribution in the near future. The report will be placed on the Agenda of the Fertilizer Industry Advisory Committee discussion at the next meeting.

Labor

The Labor Office of WFA reported that, as with some other industries, it is difficult to put across to a military-minded group the essentiality of the fertilizer industry, as it is not engaged in producing articles for direct war use. However, local representatives of WFA and alternate members of urgency committees have been able to assist in relieving labor conditions, to some extent, in the fertilizer area.

The production of fertilizers is continued in its general classification as an "essential" activity, though it was not given the higher rating of "critical" activity in the recent regulations and instructions regarding the induction into the armed forces of men in the 26-29 group. Key workers of that group in fertilizer plants would be in the classification ranking third in the order of induction. In cases where farmers might be willing to work in fertilizer plants for a few weeks in their "off" season if they could do so without changing their draft status, it would be advisable to see the County Agricultural Agent for clearance. It was pointed out that USES referral, like Selective Service classification, is mostly a local matter, and that every effort should be made to present pertinent facts to the local bodies.

The Committee adopted a resolution expressing its appreciation of the services rendered to the fertilizer industry, agriculture, and the nation at large by P. H. Groggins, the retiring chief of the Chemicals and Fertilizers Branch, WFA, and extending to him its best wishes for the future.

While no date was definitely announced, it was indicated that the next meeting of the Committee might be held in May.

FERTILIZED CORN PLANTS REQUIRE WELL VENTILATED SOILS

((Continued from page 9))

the soil does not have good ventilation, it may be necessary (a) to fertilize deeper rooting legumes, such as alfalfa and sweet clover, (b) to use drain tiles and/or establish drainage ditches, and (c) to practice deeper tillage if a plow sole or hard-pan has developed in the field. Keep in mind always that corn roots breathe and require oxygen to perform their all-important task of absorbing mineral nutrients from the soil.

Chemicals and Technique Used in Diagnosing Oxygen Deficiencies in Soils for Corn Plants

Obtain a supply of 3-inch filter papers and prepare three test solutions, A, B, and C, as follows:

Solution A.—Hydrochloric acid (HCl). Dilute concentrated CP acid, one part acid to 4 parts distilled water by volume.

Solution B.—Potassium thiocyanate (KCNS). Dissolve 10 grams potassium thiocyanate in 100 ml distilled water.

Solution C.—Potassium ferricyanide. ($K_3Fe(CN)_6$). Dissolve 0.5 gram in 100 ml distilled water.

Place all three solutions in separate bottles with droppers. They must be ready for quick service.

Tests for Ferric and Ferrous Iron

The soil tests for ferric and ferrous iron must be made within 20 or 30 seconds on samples from freshly exposed soil surfaces. With a spade dig a hole 12 to 18 inches deep in area to be tested, or use a soil auger if available. Take soil samples at 3-, 6-, 9- and 12-inch depths, deeper if desired, for the tests. Test the samples one at a time from a fresh surface at each level, by the following procedure:

1. Crease a 3- or 4-inch filter paper once.
2. Place two soil samples approximately the size of a navy bean, on the filter paper as shown in Fig. 1. Compress the sample, and then add 2 drops HCl test solution (A) to each soil mass and fold paper back onto the treated soil.
3. Turn over the folded paper and test

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When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

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122 East 42nd ST., NEW YORK CITY

Pioneer Producers of Muriate of Potash in America

See Page 4



the wet underside of the paper, at (a) with one drop of Solution B—(Ferric-iron test); and one drop Solution C—Ferrous-iron test) at (b). Fig. 2.

The results must be recorded at once:

Fig. 3—A reddish to deep red color at (a) indicates ferric iron. This means an adequate oxygen supply in soil for corn roots.

Fig. 4—A bluish to deep blue color at (b) indicates ferrous iron. This indicates an oxygen deficiency for corn roots. If both ferric and ferrous iron tests are obtained, the oxygen deficiency is relatively less important.

Discussion of Tests

The importance of making the tests very quickly can be demonstrated by permitting additional soil samples to be exposed to the air, particularly in the sunlight, for several minutes and then repeating the tests. A negative ferric iron test soon becomes a positive one and shows the rapidity of the oxidation process in many soils.

Other interesting facts on oxygen penetration in soils can be noted by making tests for ferric iron in the channels formed by deep penetrating roots of previous crops of alfalfa sweet clover, ragweed, and others. Also compare the depth of aeration over tile drains versus between tiles, if any, or between high and low areas in the field.

Always make comparative tests for ferric iron in the soil above and below the plow sole if a definite plow sole has developed in the soil. In some soils a hard-pan often interferes with the oxygen penetration below it, and corn roots may be limited in growth above the hard-pan. These tests will indicate the necessity for including deep-rooting alfalfa and sweet clover in a soil management program if the ferric iron tests are low below the plow sole.

Tests made during the growing season with ample rainfall will give much useful information on the drainage and aeration capacities of fields for corn production. In dry seasons, the oxygen supply may be adequate and water may then become the limiting factor for growth. These interrelationships of water, oxygen for root respiration, and the maintenance of a favorable environment for corn-root functioning in absorbing fertilizing materials must be given proper evaluation in diagnosing these soil conditions for corn plant growth and production.

Fertilizers in Bands Feed Fewer Weeds

The growing practice of placing fertilizers in bands alongside crop rows is a factor in saving labor and power as well as in producing higher yields. This gain, according to the Virginia Agricultural Research Administration, hinges on the control of weeds during the growing season.

Weed seedlings compete strongly with row-crop seedlings, particularly when fertilizer is applied broadcast. The reason for this, the experimenters explain, is that the plant food is as accessible to the undesirable plants as to the desirable ones. Weeds which can get added plant food grow more rapidly and vigorously, thus are more difficult to control. During periods when conditions are unfavorable for effective cultivation, weed control may become a serious problem.

But, say the researchers, placing fertilizer for row crops alongside the rows in a band two or three inches to the side and one to three inches deep is a way to favor the wanted plants over the weeds. Of course, the weed seedlings in the row, and near it, can get at the fertilizer, but the row becomes conspicuous in contrast with the rest of the land, making cultivation easier.

In some cases the major part of the fertilizer can be deeply placed under the seed, which favors the wanted plants and further restricts any advantages to the weeds. So then it is easier to kill the weeds by cutting some and covering others. The crop seedlings also get a higher percentage of the fertilizer provided.

Landlords selling fertilizers to tenants can charge no more than the applicable retail selling price of these products, according to a ruling of OPA.



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For Alphabetical List of Advertisers, see page 33.



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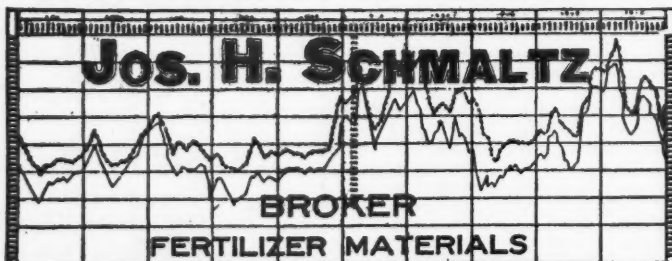
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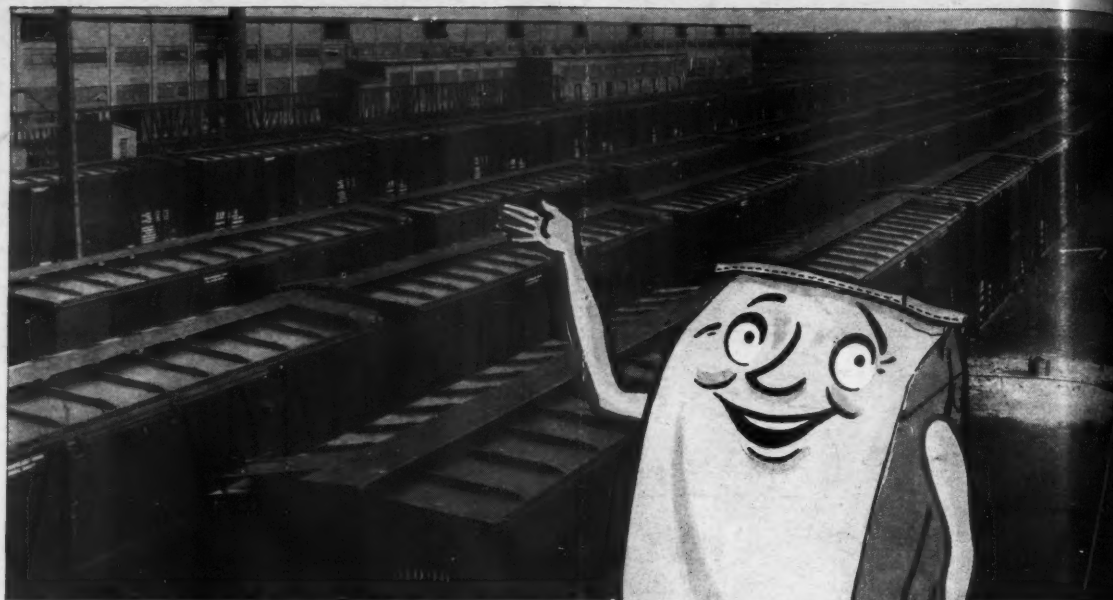


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